

## FIGURAL ROMAN BONE HANDLES FROM *MURSA*

Mangos figurativos de hueso romanos procedentes de *Mursa*

MARINA KOVAČ\*

**ABSTRACT** This paper deals with four figural handles from the Collection of Roman Bone Objects of the Archaeological Museum Osijek, Croatia. This Collection holds 19 Roman bone handles divided in four different types: Figural handles, Double-sided knife handles, Various full handles and Cylindrical handles. Three figural bone handles are clasp-knife handles (*cultellus*) and anthropomorphic displays are featured on two of them – *mur-millo* gladiator and Hercules, with a zoomorphic representation of a pig on the third one. All three objects are made of compact long bone tissue of medium-sized or large mammals. The fourth artefact, probably a patera handle with a lion's head terminal, is also made of compact long bone tissue of a medium-sized or large mammal. This artefact is clearly a high-quality piece and we believe the object came to *Mursa* as an import, while the other handles may have been manufactured locally.

**Keywords:** Figural Bone Handles, Clasp-knife Handle, Patera Handle, Archaeological Museum Osijek, *Mursa*, Gladiator, *murmillio*, *secutor*, Hercules, Pig, Lion.

**RESUMEN** El artículo analiza cuatro mangos figurativos de la Colección de objetos romanos de hueso del Museo Arqueológico de Osijek, Croacia. Esta Colección consiste en 19 mangos de hueso romanos divididos en cuatro tipos diferentes: mangos figurativos, mangos de cuchillos de doble filo, varios mangos completos y mangos cilíndricos. Tres de los mangos figurativos de hueso son mangos de cuchillos de resorte (*cultellus*) y en dos de ellos aparecen representaciones antropomórficas – un gladiador *murmillio* y Hércules, y en el tercero aparece una representación zoomórfica de un cerdo. Los tres objetos están hechos de tejido óseo compacto de hueso largo de mamíferos medianos o grandes. El cuarto artefacto, probablemente un mango patera con la cabeza de león en la punta, también está hecho de tejido óseo compacto de hueso largo de mamíferos de tamaño medio y grande. Este artefacto es obviamente una pieza de alta calidad y creemos que llegó a *Mursa* como una importación, mientras los otros mangos podrían haber sido manufacturados localmente.

**Palabras clave:** Mangos de hueso figurativos, Mango de cuchillo de resorte, Mango de patera, Museo Arqueológico de Osijek, *Mursa*, Gladiador, *murmillio*, *secutor*, Hércules, Cerdo, León.

---

\* Archaeological Museum Osijek, Trg. Sv. Trojstva 2, 31000 Osijek, Croatia. [marina.kovac@amo.hr](mailto:marina.kovac@amo.hr)  
Fecha de recepción: 31/03/2018. Fecha de aceptación: 08/05/2019.  
<http://dx.doi.org/10.30827/CPAG.v29i0.9767>

## INTRODUCTION

This paper will present four figural handles from the Collection of Roman Bone Objects of the Archaeological Museum Osijek<sup>1</sup> (Croatia). The Collection consists of a total of 1225 bone objects and *Mursa*, i.e. present-day Osijek, is the confirmed or assumed origin site for 1222 of them. The objects in question came to the Museum of Slavonia in the late 19th and the first half of the 20th century, mostly as acquisitions, random finds and donations, while a smaller number of them was found during rescue surveys in the second half of the 20th century.

Roman handles most frequently belong to swords, knives and home utensils. Skeletal material, such as, bone, horn, antler or, in some cases, ivory, was a favourite for producing handles for metal objects. Skeletal material was ideal for crafting handles because it was solid and elastic, so the final product could sustain considerable pressure while being used (Petković, 1995:48; Anderes, 2009:202).

Handles could be produced with fine or rough processing, either from a single piece using the diaphysis of a long bone or parts of compact long bone tissue, which allows for a great variety in terms of design and decorative repertoire. Knife handles are a common find at Roman sites and certain items almost seem as art, rather than craftsmanship, which is particularly true for figural clasp knife handles (Anderes, 2009:202).

The Collection of Roman bone objects holds 19 Roman bone handles divided in four different types: Figural handles, Double-sided knife handles, Various full handles, and Cylindrical handles.

## FIGURAL HANDLES

This paper will present only Figural handles (fig. 1). As the name itself suggests, this type of handles has a figurative design – anthropomorphic or zoomorphic. In our case, this type coincides with three clasp-knife handles and a handle from a kitchen utensil, most likely a patera.

### Clasp-knife handles

Clasp-knife handles (*cultellus*) have been known since the Iron Age, but it was only during romanization that they started featuring figurative designs. This means that in terms of iconography, they have some of the most elaborate designs of the Roman era. They could have been made out of skeletal material, such as bone and

---

1. By the decision of the Government of the Republic of Croatia, all archaeological collections of the Museum of Slavonia have been awarded to the newly established Archaeological Museum Osijek on December 1, 2017. Change in labels of all inventory numbers occurred in 2018.

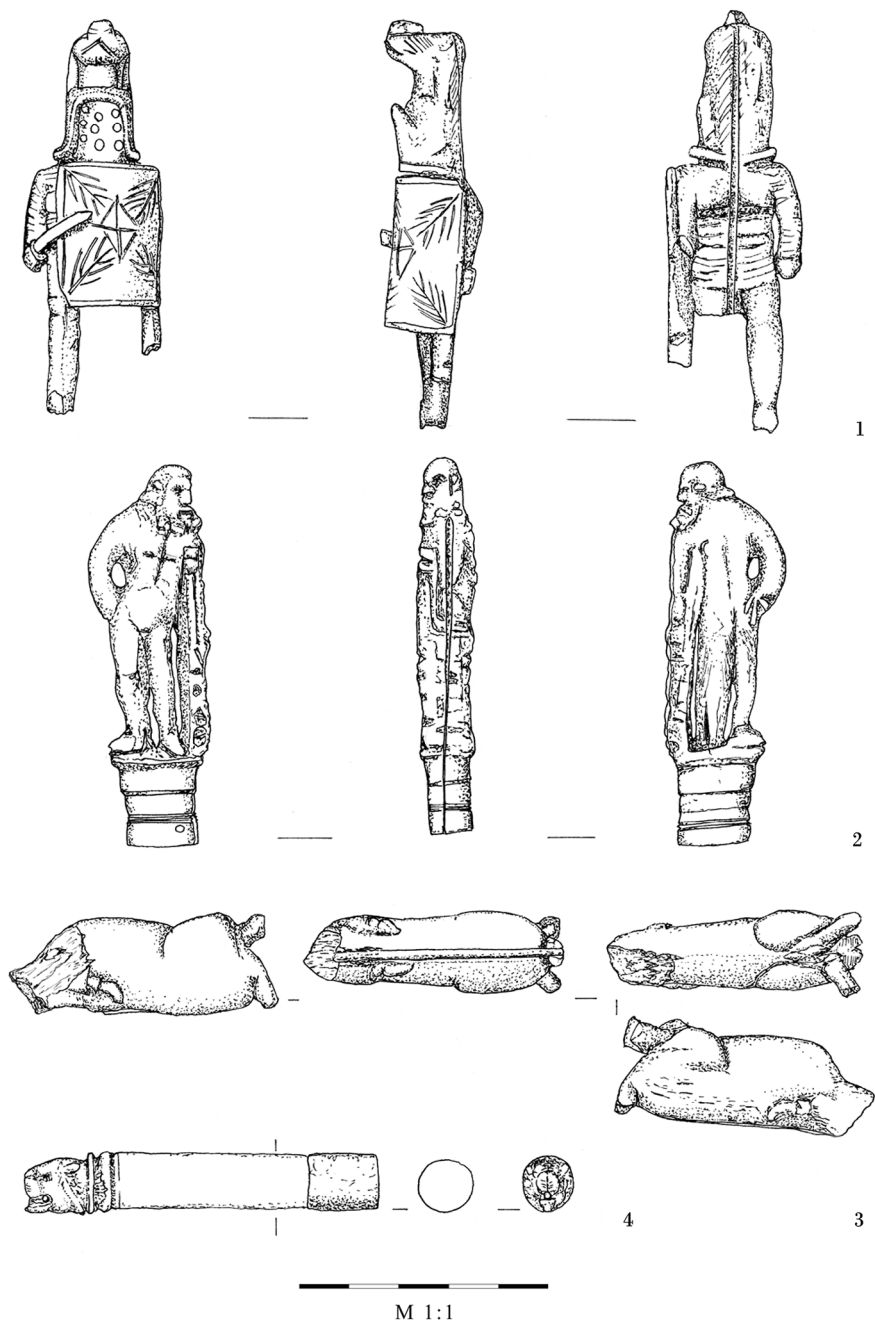


Fig. 1. Figural Roman bone handles from *Mursa* (unpublished PhD thesis Kovač, 2017: T. 5), drawing D. Radman, 2016.

ivory, or wood and metal (Jackson and Friendship-Taylor, 2002:24). It is interesting to note that the metal blade could be folded into the handle. When it was open, it was secured by the notch on the edge of the handle (Anderes, 2009:203). These knives used to be carried or wrapped up in leather or buckram pouches (Eckardt and Crummy, 2002:11).

As far as motifs are concerned, the really popular ones included gladiator motifs, brave mythical heroes like Hercules, gods and goddesses<sup>2</sup> or different animals or animal parts<sup>3</sup>, often represented in hunting scenes (Biró, 1997:180; Giovanni, 2004:10; Fries, 2008:32).

Clasp-knife handles often showed popular types of gladiators, such as, *thraex*, *murmillo*, *secutor* and *retiarius*, individually, rarely in tandem. There is a pair of gladiators shown on knife handles from Moselle and Loir-et-Cher in France, more precisely, a fight between a *secutor* and *retiarius*. Similar knife handles are known from Caerwent in Wales and Avenches in Switzerland. An unusual pair consisting of a *secutor* and Amor can be seen on another piece from Avenches (Jackson and Friendship-Taylor, 2002:24; Manche, 2004a:34; Manche, 2004b:35; Schenk, 2008:269-407; Bartus and Grimm, 2010:321-324.).

Apart from knife handles, a gladiator or a pair of fighting gladiators was featured on terra sigillata, lamp disks, frescoes, mosaics, ceramic figurines, fibulae, etc.

## Gladiator

The first clasp-knife handle has a *murmillo* gladiator<sup>4</sup> (fig. 1:1 and fig. 2). The item arrived at the Museum as Josip Handel's donation in 1895. The Inventory Book indicates that the donor found the handle on the bank of the Drava River near the Citadel in 1877, the exact location of the finding is unknown (Bulat, 1989:41,58, inv. n.° 140; Kovač, 2017:299, inv. n.° 15).

The term *murmillo* gladiator comes from the Greek word for a type of sea fish called *mormylos*, which was sometimes represented on a gladiator's helmet. During a fight, *murmillo*'s torso was exposed, he only wore a cloth around his waist (*subligaculum*) and a belt (*balteus*), which cannot be seen on our item because the body is covered with a shield (Junkelmann, 2000:48-49). If we take a closer look, we can see that he is wearing a big gladiator helmet (*cassis crista*) with a perforated visor, while the rest of the helmet is based on the wide-brimmed Boeotian helmet with a big crest on top, probably made of feathers or horse hair. He is holding a rectangular, semi-cylindrical shield (*scutum*) in his left hand with

2. Some well-known examples can be found in the Rheinischen Landesmuseum Trier – Pan (Fries, 2008:32), Hercules (Fries, 2008:33), Amor (Fries, 2008:34) and Aphrodite (Fries, 2008:35-36).

3. Popular motifs can be found in the Rheinischen Landesmuseum Trier – dog (Fries, 2008:27), lion (Fries, 2008:28), dolphin (Fries, 2008:29) and pig's hoof (Fries, 2008:30).

4. Inventory no.: AMO-AA-567; Dimensions: height: 8.0 cm; width: 2.5 cm.



Fig. 2.—Clasp-knife handle depicting a *murmillio* gladiator (Archaeological Museum Osijek, AMO-AA-567), photo V. Barjaktarić, 2017.

stylized branches in the corners and a rhombic ornament with a cross in the middle. He is also holding a broken spear (if you look at the lower part below the shield). He is holding a short sword (*gladius*) with his right hand, probably protected by a *manica* – a hand pad. *Murmillos*' only weapon against other gladiators, such as, *thraexs*, *hoplomachus* or *retiarius*, was this short sword (Junkelmann, 2000:51). Our gladiator's right leg has broken off, while the left one is missing completely. Since the legs have suffered damage, we do not know whether he had a greave on his left leg (*ocrea*). Unlike other gladiators, *murmillio* did not need to have big greaves because of his tall shield. As we can see, the gladiator is standing still, he is not getting ready to attack.

The incision for folding the blade away is on the back of the handle, right down the gladiator's back. The blade is missing, and the same is true for the part with the folding mechanism. The material used for the gladiator is, judging by the thickness, compact long bone of a medium-sized or large mammal. Our find can be traced back to a period between 1st and 4th century AD (Kovač, 2017:299, inv. n.º 15).

The gladiator from *Mursa* can be compared to the handle from Aquileia, both visually and in terms of processing. Even though A. Giovanni has established a parallel between her find and the *secutor* handle from Ostia (Giovanni, 2004:10), she points out that it is hard to identify the Aquileia gladiator more precisely without the head. We are more inclined to interpret it as a *murmillo* due to the size of the shield (*scutum*), the fact that he is holding a short sword (*gladius*) and wearing a pad (*manica*) on his right hand, as well as a greave (*ocrea*) on his left leg. Another well-known example is the handle of a small clasp-knife from *Brigetio* (Komárom-Szőny) (Biró, 1997:180,194:25), even more stylized than ours, as well as a naturalistic and detailed handle with a *secutor* from Piddington in Great Britain, dating back to the first half of 3rd century AD (Jackson and Friendship-Taylor, 2002:24). This one has a similar equipment, but wears a *secutor's* helmet. In addition, this piece is better executed than the *murmillo* from *Mursa*. Another item similar to ours can be found in Nîmes, identified by J.-C. Beal as a *thraex* (Béal, 1984:101, B.XII:378), but as far as we can tell, this gladiator is a *murmillo*. A *murmillo's* shield is bigger than a *thraex's*. Also, a *thraex* carries a *sica* – a curved sword, not a *gladius* (used more often by *murmillos*). The gladiator handle from Nîmes is virtually identical to ours, but, generally speaking, it is a more stylized piece of poorer quality.

If we look at finds from Great Britain, there are gladiator knife handles made of ivory from Corbridge (Bartus and Grimm, 2010:323) and Lexden (Jackson and Friendship-Taylor, 2002:24), featuring a *secutor* and a *murmillo*, respectively. A knife handle from South Shields has either a *secutor* or a *murmillo* because there is no helmet (Jackson and Friendship-Taylor, 2002:24). Another knife handle from an unknown site along the Hadrian's Wall is now kept in Newcastle-upon-Tyne (Cutler, 1993:172).

Another example is a clasp-knife handle with a gladiator can be found in the Archaeological Collection at the John Hopkins University in Baltimore, provenance unknown (Cutler, 1993:172-173, fig. 8-9). We believe that this headless piece could also be attributed as a *murmillo* because he is holding a semi-cylindrical shield (*scutum*) and a short sword (*gladius*) in his right hand protected by a *manica*, while there is a greave on his left leg (*ocrea*).

*Secutor* gladiators were found in Italy as well (von Mercklin, 1940:339-352), in addition to those from Ostia and Aquileia (Giovanni, 2004:10). Stylized *secutor* gladiators were also found in France-Roanne and Saint-Patrice (Guiot, 2003:20) and Slovakia, kept at the Podunajské Múzeum in Komárno (Hrnčiarik, 2012:71-72,123, Tab. XIV., 228). Lastly, there is a *secutor* from Cologne, Germany (Jackson and Friendship-Taylor, 2002:24). Clearly, the *secutor* was a favourite motif on bone handle.

There are two interesting finds from Hungary-clasp-knife handles with gladiators from the north necropolis in *Savaria* (Szombathely) featuring famous Roman gladiators *Pardus* (*murmillo*) and *Senilis* (*thraex*) (Kiss, 2006:96; Harsány *et al.*, 2012:50-51). These clasp-knife handles prove the great gladiators were so popular that they were featured on objects of every-day use.

## *Hercules*

Among the more popular choices for handles are representations of heroes and gods, with Hercules the biggest celebrity. He is usually shown with two recognizable attributes – a club and lion's skin.

Our Hercules<sup>5</sup> (fig. 1:2 and fig. 3) was found in *Mursa* in 1937, in present-day Lower Town in Osijek, at the Saponia factory in a devastated brick grave. The graves were found in *Mursa*'s eastern necropolis 1.75 meters deep, while the size and orientation of the burial are not known (Buntak 1937:14; Pinterović, 1978:T. LXV,1; Bulat, 1989:45,58, inv. n.º 141; Göricke-Lukić, 2000:41,43,60-61, TXVI, 1;



Fig. 3.—Clasp-knife handle depicting Hercules resting on his club (Archaeological Museum Osijek, AMO-AA-5694), photo V. Barjaktarić, 2017.

5. Inventory no.: AMO-AA-5694; Dimensions: height: 7.55 cm; width: 2.3 cm; thickness: 1.1 cm.

Göricke-Lukić, 2011:118-119; Kovač, 2017:299-300, inv. n.º 16). Since the graves were not found during systematic archaeological excavations archaeological documentation is completely missing and the only available data on some grave finds are registered in the first inventory book of the Museum of Slavonia, the so-called, *Celestin's Book*, in addition to the *Meeting Minutes of Društvo prijatelja starina "Mursa"* (*Antiquity Afficionados' Society "Mursa"*) from October 1937 and a newspaper article in *Hrvatski list* (*Croatian Times*) from December 1937.

This bone clasp-knife handle is shaped as Hercules resting on his club. Facial features are distinctive; we can see Hercules as a manly god. His body is muscular, but not as detailed as his face. The muscles are stylized, most clearly on his chest and abdomen. Hercules's arms are akimbo; the club is under his left armpit. He is standing on a pedestal, which is also part of the folding mechanism with a perforation for a bolt, as well as two groups of decorative notches. There is a lateral incision along the club for the blade. Hercules was made of compact long bone tissue of a large mammal. According to the coins found among the grave goods; this handle has been dated to 3rd century AD (Bulat, 1989:45,58, inv. n.º 141; Göricke-Lukić, 2000:41,60-61, TXVI, 1; Göricke-Lukić, 2011:118).

Hercules resting on his club is a common way of portraying the demigod, also seen on reliefs, sculptures, figurines, mosaics and paintings. A practically identical handle is found in Rheinischen Landesmuseum in Trier (Fries, 2008:33), which differs from ours because the Hercules from Trier is holding the club over his left shoulder, while our Hercules is reclining on it. These two handles are of similar quality.

### *Pig*

The only zoomorphic design on our handles is on the third clasp-knife handle which is probably a very stylized representation of a pig<sup>6</sup> (fig. 1:3 and fig. 4). The item came to the Museum as a donation from one of the greatest donors of the Museum of Slavonia, Carl Franz Nuber, from an unknown site in *Mursa* (Kovač, 2017:300, inv. n.º 17).

The pig is highly stylized, especially the head, with more emphasis on the ears and snout. The incision for the blade is on the lower end of the handle-the pig's belly. There is no blade or folding mechanism. This handle was also made of compact long bone tissue of a medium-sized or large mammal. Our find can be traced back to a period between 1st and 5th century AD (Kovač, 2017:300, inv. n.º 17).

Different animal and griffin designs can be found on clasp-knife handles throughout the Roman era. There are zoomorphic handles with dogs (Deschler-Erb, 1998:131, T.7:86; Fries, 2008:27), birds (Deschler-Erb, 1998:130, T.6:78), lions (Fries, 2008:28), dolphins (Fries, 2008:29), pig's hoof (Deschler-Erb, 1998:131,

---

6. Inventory no.: AMO-AA-1010; Dimensions: height: 5.1 cm; width: 1.5 cm.





Fig. 4.—Clasp-knife handle depicting a pig (Archaeological Museum Osijek, AMO-AA-1010), photo D. Dujmić, 2018.

T.7:86; Fries, 2008:30) and hunting scenes (Deschler-Erb, 1998:131, T.7:83). A very interesting find was discovered in Silchester in 2000 which is an ivory handle showing two dogs mating (Eckardt and Crummy, 2002:11).

C. Anderes traced the popularity of these figurative clasp-knife handles to the period from the 2nd to the 4th century AD (Anderes, 2009:203).

## Patera handle

Our fourth figurative handle, which may be a patera handle<sup>7</sup> (fig. 1:4 and fig. 5), was found in the area of the Topnička Barracks, the exact location of the finding is unknown, which used to occupy the southwestern part of *Mursa*. The handle was donated by the City of Osijek (Kovač, 2017:300, inv. n.° 18).

The end of this bone handle is actually a head of a lion, with a visible smaller circular perforation in the mouth, which might have been used for hanging. The head is executed in great detail. The patera handle was also made of compact long bone tissue of a medium-sized or large mammal. Our find can be attributed to a period between 1st and 5th century AD (Kovač, 2017:300, inv. n.° 18).

There is an identical item in Niculițel, Romania (Programme and abstract, 2016:1), and Xanten, Germany (Jung, 2013:90, T.54,1167), while similar handles of poorer quality can be found in *Brigetio* (Biró, 1997:196,31) and Evan Gorga's Collection in Rome (Moroni, 2013:235, fig. 6:2). An almost identical handle, a bronze one, can be found in Augst in Switzerland (Fünfschilling, 2012:173, Abb. 8,2).

Animal motifs were frequently used on patera handles and we can often see the head of a ram or a lion. An identical motif could have been executed using different raw material, such as, ceramic, metal or bone.

## CONCLUSION

The study of the entire Collection of Roman Bone Objects<sup>8</sup> has offered several conclusions. Firstly, the majority of 1222 objects from the Collection (96,4%) was made of long bone of medium-sized or large mammals – either from a segment of a diphyosis (due to their cylindric shape) or its compact tissue (considering the amount of tissue) (Kovač, 2017:246).

During the study, objects were divided into groups according to their function and subdivided according to type. There are 11 groups according to function: 1. Objects of everyday use; 2. Objects for textile processing; 3. Toiletries; 4. Jewelry; 5. Furniture parts; 6. Buttons; 7. Militaria; 8. Game and entertainment objects; 9. Typologically unidentified pins or needles; 10. Objects of unknown function; 11. Raw material, semi-finished and waste products (Kovač, 2017:251-252).

Group of Objects of every-day use is represented in 2,7% of the entire Collection, while handles make up 57,58% of the objects in this group. A type of Figural handles, 4 of which are discussed in this article, make up 21,05% of all handles in the group (Kovač, 2017:251).

7. Inventory no.: AMO-AA-1081; Dimensions: height: 7.1 cm; biggest diameter: 1.1 cm.

8. Study undertaken for the purpose of the doctoral dissertation made by the author of this article: *Tipologija i tehnologija izrade rimskih koštanih predmeta na području Donje Panonije na primjeru nalaza iz Murse // Typology and technology of Roman bone object manufacture in the Lower Pannonia area based on Mursa findings* (2017).



Fig. 5.—Patera handle depicting a lion's head (Archaeological Museum Osijek, AMO-AA-1081), photo V. Barjaktarić, 2017.

Due to a high level of processing, it is not possible to determine the type of bone used to make the first three clasp-knife handles, and the same is true of the patera handle. What is certain, however, based on morphological and surface features, is that the three clasp-knife handles were made of compact long bone tissue of a medium-sized or large mammal. It is highly likely that the gladiator handle may have been crafted from cattle or horse bone because those bones have a thick layer of compact tissue.

Production-wise, we can say there are three levels of quality: 1. Schematic, low-quality production without detailed execution (our pig clasp-knife handle); 2. medium-quality production, not so detailed, but decent craftsmanship (ours gladiator and Hercules clasp-knife handles) and 3. high-quality production, executed in great detail (our lion patera handle). Based on the characteristics of all the researched pieces from the Collection, we believe that the high-quality patera handle came to *Mursa* as an import, while the other handles may have been manufactured locally.

## BIBLIOGRAPHY

- ANDERES, C. (2009): "La collection de tabletterie du Musée de Nyon", *Annuaire d'Archéologie Suisse* 92, pp. 201-237.
- BARTUS, D. and GRIMM, J. (2010): "A Knife Handle from Caerwent (Venta Silurum) Depicting Gladiators", *Britannia* 41, pp. 321-324.
- BUNTAK, F. (1937): "Rimski grobovi u Osijeku. Nešto o nalazima prigodom kopanja temelja za nove zgrade tvornice Schicht-Lever", *Hrvatski list* 4:12, 1937, pp. 14.
- BÉAL, J.C. (1984): *Les objets de tabletterie antique du Musée Archéologique de Nîmes*, Cahiers des Musées et Monuments de Nîmes 2, Nîmes.
- BIRÓ, M.T. (1997): "Adalékok Brigetio csontiparához", *Komárom-Esztergom Megyei Múzeumok Közleményei* 5, pp. 175-203.
- BULAT, M. (1989): *Mursa-Osijek u rimsko doba*, Muzej Slavonije, Osijek.
- CUTLER, A. (1993): "Five lessons in late Roman ivory", *Journal of Roman Archaeology* 6, pp. 167-192.
- DESCHLER-ERB, S. (1998): *Römische Beinartefakte aus Augusta Raurica. Rohmaterial, Technologie, Typologie und Chronologie*, Band 1, Forschungen in August 27, Römerstadt Augusta Raurica, Augst.
- ECKARDT, H. and CRUMMY, N. (2002): "Ivory folding-knife handle from Silchester (G-B)", *Bulletin Instrumentum* 15, pp. 11.
- FRIES, A. (2008): "Figürliche Klappmessergriffe aus Bein im Rheinischen Landesmuseum Trier", *Funde und Ausgrabungen im Bezirk Trier* 40, pp. 24-36.
- FÜNFSCILLING, S. (2012): "Schreibgeräte und Schreibzubehör aus Augst", *Jahresberichte aus Augst und Kaiseraugst* 33, pp. 163-236.
- GIOVANNI, A. (2004): "Manico di coltello figurato in osso Aquileia-Museo Archeologico Nazionale (I)", *Bulletin Instrumentum* 19, pp. 10-11.
- GÖRICKE-LUKIĆ, H. (2000): *Sjeveroistočna nekropola rimske Murse*, Hrvatska akademija znanosti i umjetnosti and Muzej Slavonije, Zagreb-Osijek.
- GÖRICKE-LUKIĆ, H. (2011.): *Nekropole rimsko-dobne Murse*, Muzej Slavonije, Osijek.
- GUIOT, T. (2003): "Le couteau pliant en forme de gladiateur découvert à Saint-Patrice (Indre-et-Loire, F)", *Bulletin Instrumentum* 17, pp. 20.
- HARSÁNY, E. et. al. (2012): *Im Auftrag des Adlers. Publius Ferraisus Avitus Ein Soldat Roms in Krieg und Frieden / A római sas szolgnlatban. Publius Ferraisus Avitus Róma katonája háborúban és békében*, Römermuseum, Ostendburken.
- HRNČIARIK, E. (2012): *Rímske kostené výrobky v zbierke Podunajského múzea v Komárne*, Katalóg VI, Rímske zbierky, Podunajské múzeum v Komárne y Trnavská univerzita v Trnave, Komárno.
- JACKSON, R. y FRIENDSHIP-TAYLOR, R. (2002): "The Piddington Gladiator Clasp Knife (G.-B.)", *Bulletin Instrumentum* 16, p. 24.
- JUNG, P. (2013): *Die Römischen Beinartefakte aus dem Gebiet der Colonia Ulpia Traiana (Xanten)*, Xantener Berichte, Grabung – Forschung – Präsentation, Band 26, Verlag Philipp von Zabern, Darmstadt / Mainz.
- JUNKELMANN, M. (2000): "Familia Gladiatoria: The Heroes of the Amphitheatre", *The Power of Spectacle in Ancient Rome: Gladiators and Caesars* (E. Köhne and C. Ewigleben, eds.), University of California Press, Berkeley and Los Angeles, pp. 31-74.

- KISS, P. (2006): "Urnák, hamvak, leletek-Régészeti feltárás Savaria északi temetőjében", *Ókor* 2, pp. 93-96.
- KOVAČ, M. (2017): *Tipologija i tehnologija izrade rimskih koštanih predmeta na području Donje Panonije na primjeru nalaza iz Murse*//*Typology and technology of Roman bone object manufacture in the Lower Pannonia area based on Mursa findings*, Filozofski fakultet, Zagreb (unpublished PhD thesis).
- MANCHE (2004a): "Manche de canif de Mossele", *Bulletin Instrumentum* 19, pp. 34.
- MANCHE (2004b): "Manche de canif du Loir-de-Cher", *Bulletin Instrumentum* 19, pp. 35.
- von MERCKLIN, E. (1940): "Römische Klappmesser", *Serta Hoffleriana. Festschrift V. Hoffler*, Zagreb, pp. 339-352.
- MORONI, M. T. (2013): "Oggetti in osso e avorio", *Museo Romano Nazionale. Evan Gorga la collezione di archeologia* (A. Capodiferro, ed.), Mondadori Electa, Milano, pp. 226-242.
- PETKOVIĆ, S. (1995): *Rimski predmeti od kosti i roga sa teritorija Gornje Mezije*, Arheološki institut, Beograd.
- PINTEROVIĆ, D. (1978): *Mursa i njeno područje u antičko doba*, Hrvatska akademija znanosti i umjetnosti and Muzej Slavonije, Osijek.
- Programme and abstracts (2016): *11th Meeting of the ICAZ Worked Bone Research Group, 23-28 May 2016*, Iași, Romania.
- SCHENK, A. (2008): *Regard sur la tabletterie antique. Les objets en os, bois de cerf et ivoire du Musée Romain d'Avenches*, Documents du Musée Romain d'Avenches 15, Association Pro Aventico, Avenches.